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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/901,858 | 07/09/2001 | Alfred Hagemeyer | 99-34R1 | 8086 |

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| EXAMINER | |
|---|---|
| QUAN, ELIZABETH S | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1743 | |

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 09/901,858 | HAGEMEYER ET AL. |
| | **Examiner** | **Art Unit** |
| | Elizabeth Quan | 1743 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-72* is/are rejected.

7)☒ Claim(s) *19,44 and 65* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8192002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed 8/19/2002 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. DE 2714939 B2 has been placed in the application file, but the information referred to therein has not been considered.

2. The information disclosure statement filed 8/19/2002 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. WO 00/14529 and Wijngaarden et al.'s "Industrial Catalysts--Optimizing Catalysts and Processes" have been placed in the application file, but the information referred to therein has not been considered.

3. Note: A literature reference, which is divided into "2.2 APPLY EFFECTIVE EXPERIMENTAL STRATEGIES" and "2.3 COLLECT MEANINGFUL CATALYST PERFORMANCE DATA", was submitted with no source data. It is unclear if it is Wijngaarden et al.'s "Industrial Catalysts--Optimizing Catalysts and Processes". The source data must be submitted with the literature in order for it to be considered.

### *Claim Objections*

4. Claims 19, 44 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to

cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The parent claim already states that each of the catalysts has substantially the same composition, such that further recitation of each catalyst being substantially the same catalyst fails to further limit the claim.

5. Claim 65 is objected to because of the following informalities: "twelve" should be "sixteen". Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. Claim 63 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 63 recites the limitation "the eight or more reference catalysts" in the last two lines. There is insufficient antecedent basis for this limitation in the claim.

9. Regarding claims 61, 63, it is unclear what differentiates the catalysts claimed in the parent claim from the reference catalysts.

10. Regarding claim 63, it is unclear how interpolation or extrapolation is made by comparison of a curve for one catalyst composition with a curve of eight reference catalysts. There is probably a lack of essential method steps.

### *Claim Rejections - 35 USC § 103*

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1. Determining the scope and contents of the prior art.
    2. Ascertaining the differences between the prior art and the claims at issue.
    3. Resolving the level of ordinary skill in the pertinent art.
    4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 1-16, 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calleja et al.'s "Co/HZSM-5 Catalyst for Syngas Conversion: Influence of Process Variables" in view of U.S. Patent No. 6,627,445 to Akporiaye et al. or WO 99/19724 to Atkins et al. or U.S. 6,149,882 to Guan et al.

Calleja et al. disclose a method for evaluating process conditions for converting syngas to hydrocarbons under the catalyst Co/HZSM-5 by conducting several experiments (tables 1 and 2; figs. 1-6; EXPERIMENTAL). The catalyst was prepared by the incipient-wetness impregnation

technique from cobalt and thorium nitrate solutions using drying, calcination, and reduction conditions previously optimized (EXPERIMENTAL). The ZSM-5 zeolite was synthesized by an undisclosed procedure used in the laboratory. Since there is a concern with the reliability of the experimental data, such that a selected run is repeated three times under the same conditions with the catalyst replaced in the reactor every time, one would expect that each of the catalysts in the reactors are prepared under substantially the same conditions. The feed gases ($H_2$ and CO) and carrier gas (He) were fed into the reactor, and products water and gasoline range hydrocarbon mixture were collected at the exit. The hydrocarbons of interest include those with at least six carbons ($C_6$+) whether they are aromatic, aliphatic, or olefinic. A factorial experimental design was used to establish the influence of process variables on syngas conversion. Suitable ranges of the variables were experimentally determined, and the ranges and values for the central point of the factorial design were deduced. Four experiments were carried out under the conditions of the central point of the design to determine the standard deviation of the experimental error for the objective function of yield and selectivity to $C_6$+. Considering the suitable experimental ranges in the orthogonal factorial design of experiments, sixteen experiments were carried out and the variables were defined in terms of statistical variables (table 1). The results were fitted to non-linear polynomial equations to express the yield and selectivity in terms of the first-order effects and all k-factor interactions. The curvature, which was confirmed by statistical analysis, shows that a simple two-level factorial design was inadequate to describe the dependence of the yield and selectivity on the variables. A higher-level factorial design was used to supplement the experimental design. A central composite design was selected, and a set of eight complementary experiments was carried out. From the experimental results, response surfaces or prediction

equations for the yield and selectivity were obtained. Fig. 1 shows the response surface of yield with respect to temperature and pressure for fixed values of space velocity and $CO/H_2$ molar ratio. Each experiment involves controllably varying a set of reaction conditions, including space velocities, contact times, temperatures, pressures, and feed compositions and determining the conversion of CO and selectivity to $C_6$+ (abstract; tables 1 and 2; figs. 1-6; EXPERIMENTAL). The following tables illustrate the results from central-point experiments and supplementary experiments of complementary design.

| Figure 2. Effect of Reaction Temperature on CO Conversion and $C_6$+ Selectivity | | | | | | |
|---|---|---|---|---|---|---|
| Experiment # | Temperature (°C) | Space Velocity ($h^{-1}$) | $CO/H_2$ Feed Molar Ratio | Pressure (MPa) | CO Conversion (%) | $C_6$+ Selectivity (%) |
| 1 | 240 | 0.9 | 1.2 | 2.1 | 11 | 38 |
| 2 | 280 | 0.9 | 1.2 | 2.1 | 33 | 30 |
| 3 | 320 | 0.9 | 1.2 | 2.1 | 62 | 8 |

| Figure 3. Effect of Space Velocity on CO Conversion and $C_6$+ Selectivity | | | | | | |
|---|---|---|---|---|---|---|
| Experiment # | Space Velocity ($h^{-1}$) | Temperature (°C) | $CO/H_2$ Feed Molar Ratio | Pressure (MPa) | CO Conversion (%) | $C_6$+ Selectivity (%) |
| 4 | 0.5 | 280 | 1.2 | 2.1 | 42 | 26 |
| 5 | 0.9 | 280 | 1.2 | 2.1 | 34 | 30 |
| 6 | 1.3 | 280 | 1.2 | 2.1 | 25 | 24 |

| Figure 4. Effect of $CO/H_2$ on CO Conversion and $C_6$+ Selectivity | | | | | | |
|---|---|---|---|---|---|---|
| Experiment # | $CO/H_2$ Feed Molar Ratio | Temperature (°C) | Space Velocity ($h^{-1}$) | Pressure (MPa) | CO Conversion (%) | $C_6$+ Selectivity (%) |
| 7 | 0.5 | 280 | 0.9 | 2.1 | 79 | 11 |
| 8 | 1.2 | 280 | 0.9 | 2.1 | 34 | 30 |
| 9 | 1.9 | 280 | 0.9 | 2.1 | 21 | 31 |

| Figure 5. Effect of Reaction Pressure on CO Conversion and $C_6$+ Selectivity | | | | | | |
|---|---|---|---|---|---|---|
| Experiment # | Pressure (MPa) | Temperature (°C) | Space Velocity ($h^{-1}$) | $CO/H_2$ Feed Molar Ratio | CO Conversion (%) | $C_6$+ Selectivity (%) |
| 10 | 0.1 | 280 | 0.9 | 1.2 | 19 | 0 |
| 11 | 2.1 | 280 | 0.9 | 1.2 | 33 | 29 |
| 12 | 4.1 | 280 | 0.9 | 1.2 | 35 | 20 |

| Figure 6. Effect of Contact Time on CO Conversion and $C_6$+ Selectivity | | | | | | | |
|---|---|---|---|---|---|---|---|
| Experiment # | Contact Time (h) | Temperature (°C) | Space Velocity ($h^{-1}$) | $CO/H_2$ Feed Molar Ratio | Pressure (MPa) | CO Conversion (%) | $C_6$+ Selectivity (%) |
| 13 | 12 | 280 | 0.9 | 1.0 | 2.1 | 37 | 41 |
| 14 | 24 | 280 | 0.9 | 1.0 | 2.1 | 35 | 37 |
| 15 | 48 | 280 | 0.9 | 1.0 | 2.1 | 32 | 32 |
| 16 | 72 | 280 | 0.9 | 1.0 | 2.1 | 35 | 34 |
| 17 | 120 | 280 | 0.9 | 1.0 | 2.1 | 31 | 33 |
| 18 | 168 | 280 | 0.9 | 1.0 | 2.1 | 31 | 31 |
| 19 | 264 | 280 | 0.9 | 1.0 | 2.1 | 31 | 31 |

The CO conversion and $C_6$+ selectivity were determined from the graphs (figs. 2-6). As shown above, three different temperatures in experiments 1-3, three different space velocities experiments 4-6, three different $CO/H_2$ Feed Molar Ratios or compositions in experiments 7-9, three different pressures in experiments 10-12, and seven different contact times in experiments 13-19 were used. When the varied set of reaction conditions comprise at least three different space velocities and at least two different temperatures as shown in experiments 1-6, the determined conversion of a conversion-limiting reactant includes a range of values from about 11% to about 62%, which is from less than about 10% to more than about 50%. The range of conversion values spans about a 51% conversion difference. When the varied set of reaction conditions comprise at least three different space velocities and at least two different pressures as shown in experiments 4-6 and 10-12, the range in conversion is about 19% to about 42%, which

is less than about 20% to about more than about 40%. When the varied set of reaction conditions comprise three different temperatures, three different space velocities, and three different feed compositions as show in experiments 1-9, the range of values is about 11% to about 79%, which is from less than about 10% to more than about 70%. Note that the language "comprising" is open language, such that at least three different space velocities, contact times, or combinations thereof, and at least two different temperatures, pressures, or feed compositions affords three different temperatures, three different space velocities, and three different feed compositions. This is especially true when six or more reactors are claimed, such that there are six or more experiments. When the varied set of reaction conditions comprise at least three different space velocities and at least two different contact times as shown in experiments 4-6 and 13-19, the range in conversion is from about 25 % to about 42%, which is less than about 20% to more than about 40% or about 10% to about 50%. The range of conversion values spans a 17% difference, which may be viewed as at least about 10% or 20% conversion difference.

Calleja et al. fail to disclose simultaneously supplying one or more reactant to each of the six or more reactors of a parallel flow reactor and simultaneously discharging a reactor effluent from each of the six or more reactors. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the method of Calleja et al. the steps of simultaneously supplying one or more reactant to each of the six or more reactors of a parallel flow reactor and simultaneously discharging a reactor effluent from each of the six or more reactors to simultaneously analyze the reactor effluent from each of the six or more reactors in a rapid, economical, accurate, and consistent manner as taught by Akporiaye et al. (col. 2, lines 41-52, and 54-63; col. 3, lines 25-31; col. 8, lines 61-67; col. 9, lines 2-4, 7-10, 26,

27, and 31-37) or Atkins et al. (abstract; figs. 23 and 28; page 16, lines 23-29; page 29, lines 11-35; page 31, lines 18-32) or Guan et al. (abstract; claims 1-50).

Calleja et al. fail to disclose that conversion values range from less than about 2% to more than about 5% or less than about 1% to more than about 10%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reaction conditions in the method of Calleja et al. for the claimed conversion range values in order to provide a clear picture of process variables versus reactor conversion, as one of ordinary skill would have been most interested in reaction yields.

15. Claims 17, 27-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calleja et al.'s "Co/HZSM-5 Catalyst for Syngas Conversion: Influence of Process Variables" in view of U.S. Patent No. 6,627,445 to Akporiaye et al. or WO 99/19724 to Atkins et al. or U.S. 6,149,882 to Guan et al. as applied to claims 1-16, 18-26 above, and further in view of U.S. Patent No. 5,985,356 to Schultz et al. and U.S. Patent No. 6,063,633 to Willson, III.

As noted above, Calleja et al. disclose at least twelve experiments run with at least twelve catalysts with substantially the same composition by controllably varying reaction conditions, including space velocity, contact time, temperature, pressure, and feed composition. In fact, the varied reaction conditions include at least three different space velocities, at least three different temperatures, at least three different feed compositions, at least three pressures, and at least seven different contact times. CO conversion and selectivity to syngas were determined in each experiment. Akporiaye et al., Atkins et al., and Guan et al. each disclose one or more reactants simultaneously supplied to each of twelve or more reactors of a parallel flow reactor under reaction conditions to effect a chemical reaction of interest with each of the twelve or more

reactors comprising a catalyst having activity for the chemical reaction and simultaneously discharging a reactor effluent from each of the twelve or more reactors to simultaneously analyze the reactor effluent from each of the twelve or more reactors in a rapid, economical, accurate, and consistent manner.

Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guan et al. fail to disclose a first set of reaction conditions controllably varied between each of a first set of six or more reactors each of which has catalysts having the same first composition and a second set of reaction conditions controllably varied between each of a second set of six or more reactors each of which has catalysts having the same second composition wherein the second composition may be the same or different from the first composition and the first set of reaction conditions may be the same or different from the second set of reaction conditions. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guan et al. to include the latter limitations since Schultz et al. teach at least two different arrays of materials are prepared by delivering substantially the same reaction components at substantially identical concentrations to predefined regions on both first and second substrates and subjecting the components on the first substrate to a first set of reaction conditions and the components on the second substrate to a second set of reaction conditions wherein the first and second sets of reaction conditions may be the same or different in order to efficiently conduct the same or different tests with the same or different materials (abstract; col. 29, line 65-col. 31, line 38) and Willson, III teaches testing a plurality of different catalysts. It follows that the same variation in reaction conditions as illustrated by Calleja et al. may be duplicated for a catalyst other than Co/HZSM-5, such as a

conventional Fischer-Tropsch catalyst, since Calleja et al. is making a comparison between Co/HZSM-5 and a conventional Fischer-Tropsch catalyst. For instance, each of the first and second sets of reaction conditions may comprise of at least three different space velocities and at least two different temperatures or at least three different space velocities and at least two different pressures or at least three space velocities and at least two different feed compositions or at least three different contact times and at least two different temperatures or at least three different contact times and at least two different pressures or at least three different contact times and at least two different feed compositions or at least three different space velocities and at least two different contact times. Furthermore, since Schultz et al. and Willson, III provide motivation for applying the same variation of reaction conditions as provided in Callelja et al. to different catalysts and Callelja et al. disclose the importance of using catalyst prepared under the same preparation conditions, it follows that each of the catalyst of the first set are prepared under substantially the same first preparation conditions and each of the catalyst of the second are prepared under substantially the same second preparation conditions.

Calleja et al. fail to disclose the first and second sets of reaction conditions each with a range for conversion values that span at least about 10%, 20%, or 40% conversion difference or each with a range of values ranging from less than about 20% to more than about 40%, less than about 10% to more than about 50%, less than about 10% to more than about 70%, less than about 2% to more than about 5%, or less than about 1% to more than about 10%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reaction conditions in the method of Calleja et al. for the claimed conversion

difference or range of values in order to provide a clear picture of process variables versus reactor conversion, as one of ordinary skill would have been most interested in reaction yields.

16. Claims 52-61, 65-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calleja et al.'s "Co/HZSM-5 Catalyst for Syngas Conversion: Influence of Process Variables" in view of U.S. Patent No. 6,627,445 to Akporiaye et al. or WO 99/19724 to Atkins et al. or U.S. 6,149,882 to Guan et al., and further in view of U.S. Patent No. 5,985,356 to Schultz et al. and U.S. Patent No. 6,063,633 to Willson, III.

As noted above, Calleja et al. disclose at least twelve, sixteen, twenty, or twenty-four experiments run with at least twelve, sixteen, twenty, or twenty-four catalysts with substantially the same composition by controllably varying reaction conditions, including space velocity, contact time, temperature, pressure, and feed composition. In fact, the varied reaction conditions include at least three different space velocities, at least three different temperatures, at least three different feed compositions, at least three pressures, and at least seven different contact times. CO conversion and selectivity to syngas were determined in each experiment. Akporiaye et al., Atkins et al., and Guan et al. each disclose one or more reactants simultaneously supplied to each of twelve, sixteen, twenty, or twenty-four or more reactors of a parallel flow reactor under reaction conditions to effect a chemical reaction of interest with each of the twelve, sixteen, twenty, or twenty-four or more reactors comprising a catalyst having activity for the chemical reaction and simultaneously discharging a reactor effluent from each of the twelve, sixteen, twenty, or twenty-four or more reactors to simultaneously analyze the reactor effluent from each of the twelve, sixteen, twenty, or twenty-four or more reactors in a rapid, economical, accurate, and consistent manner.

Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guan et al. fail to disclose a first set of reaction conditions controllably varied between each of a first set of four or more reactors each of which has catalysts having the same first composition, second set of reaction conditions controllably varied between each of a second set of four or more reactors each of which has catalysts having the same second composition, third set of reaction conditions controllably varied between each of a third set of four or more reaction each of which has catalysts having the same third composition, and fourth set of reaction conditions controllably varied between each of a fourth set of four or more reactors each of which has catalysts having the same fourth composition wherein the first, second, third, and fourth compositions are different and the first, second, third, and fourth set of reaction conditions may be the same or different. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guan et al. to include the latter limitations since Schultz et al. teach **at least two** different arrays of materials are prepared by delivering substantially the same reaction components at substantially identical concentrations to predefined regions on both first and second substrates and subjecting the components on the first substrate to a first set of reaction conditions and the components on the second substrate to a second set of reaction conditions wherein the first and second sets of reaction conditions may be the same or different in order to efficiently conduct the same or different tests with different materials (abstract; col. 29, line 65-col. 31, line 38) and Willson, III teaches testing a plurality of different catalysts. It follows that the same variation in reaction conditions as illustrated by Calleja et al. may be duplicated for catalysts other than Co/HZSM-5, such as three other different catalysts. For instance, each of the

first, second, third, and fourth sets of reaction conditions may comprise of at least three different space velocities and at least two different temperatures or at least three different space velocities and at least two different pressures or at least three space velocities and at least two different feed compositions or at least three different contact times and at least two different temperatures or at least three different contact times and at least two different pressures or at least three different contact times and at least two different feed compositions or at least three different space velocities and at least two different contact times.

Calleja et al. fail to disclose the first and second sets of reaction conditions each with a range for conversion values that span at least about 10%, 20%, or 40% conversion difference or each with a range of values ranging from less than about 20% to more than about 40%, less than about 10% to more than about 50%, less than about 10% to more than about 70%, less than about 2% to more than about 5%, or less than about 1% to more than about 10%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reaction conditions in the method of Calleja et al. for the claimed conversion difference or range of values in order to provide a clear picture of process variables versus reactor conversion, as one of ordinary skill would have been most interested in reaction yields.

17. Claim 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calleja et al.'s "Co/HZSM-5 Catalyst for Syngas Conversion: Influence of Process Variables" in view of U.S. Patent No. 6,627,445 to Akporiaye et al. or WO 99/19724 to Atkins et al. or U.S. 6,149,882 to Guan et al. and U.S. Patent No. 5,985,356 to Schultz et al. and U.S. Patent No. 6,063,633 to Willson, III., and further in view of U.S. Patent No. 6,602,714 to Tagge et al.

Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guane et al. and Schultz et al. and Willson, III fail to disclose that two or more of the reactors are blank with the essential absence of catalysts. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guane et al. and Schultz et al. and Willson, III to provide two or more reactions without catalysts to ensure the test results are not overly influenced by what position a particular catalyst occupied in the array as taught by Tagge et al.

18. Claims 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calleja et al.'s "Co/HZSM-5 Catalyst for Syngas Conversion: Influence of Process Variables" in view of U.S. Patent No. 6,627,445 to Akporiaye et al. or WO 99/19724 to Atkins et al. or U.S. 6,149,882 to Guan et al. and U.S. Patent No. 5,985,356 to Schultz et al. and U.S. Patent No. 6,063,633 to Willson, III., and further in view of U.S. Patent No. 6,063,724 to Resasco et al. or U.S. Patent No. 5,733,839 to Espinoza et al. or U.S. Patent No. 5,641,395 to Hettinger, Jr. et al. or U.S. Patent No. 5,424,262 to de Lasa et al. or U.S. Patent No. 4,467,046 to Smith et al. or U.S. Patent No. 3,243,449 to Winnick.

None of the previously cited references teach interpolating or extrapolating at least a portion of a master curve defined by a plot of the selectivity versus conversion of the reaction of interest. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Calleja et al. in view of Akporiaye et al. or Atkins et al. or Guane et al. and Schultz et al. and Willson, III to perform the latter claimed limitation since it is well known to perform such analysis of the data to extract useful

information about the effectiveness of catalysts as taught by Resasco et al. or Espinoza et al. or Hettinger, Jr. et al. or de Lasa et al. or Smith et al. or Winnick.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Quan whose telephone number is (571) 272-1261. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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